Space Weather Forecast

Issued on Tuesday, 06 February 2024 at 13:25 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

Space Weather Forecast Headline: Moderate flares expected, with a chance of Strong flares.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate, with a long-period Moderate flare peaking at 06/0312UTC from the large region in the southwest. There are twelve sunspot regions however most of these are small and either stable or fading with only two of particular note. A large and active region on the southeast disc has a complex but ragged main spot which includes some complex magnetic fields including close proximity opposite polarities. The other main region is a smaller but still complex and active area in the southwest disc, which is becoming hard to assess due to both its southern and western location, however this consists of two close proximity opposite magnetic polarity spots, leading to an unstable configuration.

Preliminary analysis of the coronal mass ejection (CME) that left the Sun in association with the Moderate flare from the large region in the southwest this morning gives potential for a glancing blow late on 08 February or early on 09 February, but requires further examination.

Solar Wind / Geomagnetic Activity: Solar winds were indicative of the onset of a weak fast wind from a coronal hole. Initially near background, at around 400 km/s, these rose from 05/1500 UTC and are now elevated at just over 500km/s. Interplanetary Magnetic field (IMF) was moderate but has become weak again. The important north-south component was also moderate at times but is now varying more weakly. Geomagnetic activity was mostly Quiet (Kp0-2), with an Unsettled (Kp3) interval in the early hours of the UTC day 06 February.

Energetic Particles / Solar Radiation: The count rate of energetic particles is slightly elevated, but well below the S1/Minor Storm threshold.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate activity expected, with further Moderate flares and a chance of Strong flares. These most likely from either the large region in the southeast, or from the smaller region in the southwest. This risk decreases slightly day 3 onward as the southwest spot recedes on the far-side.

Solar Wind / Geomagnetic Activity: Current coronal hole sourced fast winds are expected to gradually ease days 1-2 (06-07 Feb), with elevated speeds easing to background. The CME that left the Sun in association with the M4.2 flare in the morning of 06 February may provide a glancing blow late on 08 February or into 09 February, with chance of G1/Minor Storm, but requires further analysis. Geomagnetic activity is expected to be mostly Quiet other than during the period of possible CME arrival.

Energetic Particles / Solar Radiation: The count rate of energetic particles has a chance of rising above background in response to any large flares that may occur. This will bring a slight chance of reaching the S1 Minor Solar Radiation Storms level.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	10	30
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	80	70	60
Very Active	R3 to R5 X	No	30	30	20	15

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	20	20
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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